The capacitive palm button is an ergonomic alternative to mechanical pushbuttons. Unlike its mechanical counterpart, P+F capacitive palm buttons require only a simple touch to activate. They can even sense the operator’s hands through gloves! This sensitivity greatly reduces an operator’s risk of contracting repetitive motion injuries, such as carpal tunnel syndrome. Designed for use with standard two-hand machine control, the palm button’s patented design eliminates the possibility of false actuation due to RFI (radio frequency interference).

This product has been tested by Underwriters Laboratory, and is recognized under Standard UL 491 “Standard for Power Operated Machine Controls and Systems.”

The requirements of UL 491 are in accordance with the following Standards:

- **NFPA79** The Standard for Metal Working Tools
- **NFPA70** National Electrical Code
- **ANSI B11.1** Standard for the Construction Care and Use of Mechanical Power Presses
- **OSHA** Section 1910.217

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**Ergonomic Safety Palm Button**

- Requires only a simple touch to activate
- Reduces risk of carpal tunnel syndrome and other repetitive motion injuries
- Prevents false triggering caused by RFI
- “Captive-Contact” relay outputs
- Available mounted in an FS box or cover plate assembly
- UL listed with U.S. and Canadian safety standards

**WARNING**

This product may cause substantial personal injury or property damage if it is not installed and used in accordance with the manufacturer’s instructions and in accordance with the regulations of the Occupational Safety and Health Administration part 1910.217, the procedures prescribed by the American National Standards Institute B11.1 and B11.19, and all other applicable regulations, procedures and codes. The manufacturer shall not be responsible or liable for any injury or damage resulting from use of the product in any such applications or the failure to comply with any such regulation, procedure or code.

**IMPORTANT:**

See pages 288, 290 and 292 for information concerning operating standards and safety.
Insensitive to overspray and residue from virtually any cutting fluid or lubricant!

### Specifications

<table>
<thead>
<tr>
<th></th>
<th>AC</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model Number</strong></td>
<td>PB1-008-6</td>
<td>PB2-008-6</td>
</tr>
<tr>
<td><strong>Actuation</strong></td>
<td>Hand sensitive — requires no physical pressure to initiate. Works with and without gloves.</td>
<td>Hand sensitive — requires no physical pressure to initiate. Works with and without gloves.</td>
</tr>
<tr>
<td><strong>Output Relay: Contact Set.</strong></td>
<td>2 — Normally open 2 — Normally closed</td>
<td>2 — Normally open 2 — Normally closed</td>
</tr>
<tr>
<td><strong>Current Rating</strong></td>
<td>1A, AC or DC</td>
<td>1A, AC or DC</td>
</tr>
<tr>
<td><strong>Voltage Rating</strong></td>
<td>250VAC max.</td>
<td>250VAC max.</td>
</tr>
<tr>
<td><strong>Mechanical Life</strong></td>
<td>≥5x10⁷</td>
<td>≥5x10⁷</td>
</tr>
<tr>
<td><strong>Electrical Life</strong></td>
<td>≥5x10⁶</td>
<td>≤5x10⁶</td>
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<tr>
<td><strong>Supply Voltage</strong></td>
<td>120VAC/45-60Hz</td>
<td>24VDC</td>
</tr>
<tr>
<td><strong>LED(s)</strong></td>
<td>Yes (1)</td>
<td>Yes (1)</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>≤1W</td>
<td>≤1W</td>
</tr>
<tr>
<td><strong>Mechanical Shock Test Limit</strong></td>
<td>45g for 2ms</td>
<td>45g for 2ms</td>
</tr>
<tr>
<td><strong>Vibration Test Limit</strong></td>
<td>fs60Hz @ ≤1mm, max. 4g</td>
<td>fs60Hz @ ≤1mm, max. 4g</td>
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<tr>
<td><strong>Fast Transient-immunity (IEC1000-4-4)</strong></td>
<td>4kV</td>
<td>4kV</td>
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<tr>
<td><strong>Surge Voltage Immunity (IEC1000-4-5)</strong></td>
<td>Symmetrical 1000V</td>
<td>500V</td>
</tr>
<tr>
<td></td>
<td>Nonsymmetrical 2000V</td>
<td>500V</td>
</tr>
<tr>
<td><strong>Electrostatic Discharge Immunity (IEC1000-4-2)</strong></td>
<td>8kV</td>
<td>8kV</td>
</tr>
<tr>
<td><strong>Radio Frequency Immunity (IEC1000-4-3)</strong></td>
<td>10V/m*</td>
<td>10V/m*</td>
</tr>
<tr>
<td><strong>Conducted Noise Immunity (IEC1000-4-6)</strong></td>
<td>10V (RMS)*</td>
<td>10V (RMS)*</td>
</tr>
<tr>
<td><strong>Protection (IEC)</strong></td>
<td>IP64</td>
<td>IP64</td>
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<tr>
<td><strong>Working Temperature Range</strong></td>
<td>0°F to +122°F</td>
<td>0°F to +122°F</td>
</tr>
<tr>
<td><strong>Response Time</strong></td>
<td>ON time delay ≤80ms OFF time delay ≤80ms</td>
<td>ON time delay ≤80ms OFF time delay ≤80ms</td>
</tr>
<tr>
<td><strong>CE Reference</strong></td>
<td>EMC-directive 89/336/EEC EN 50081-2, EN 50082-2</td>
<td>EMC-directive 89/336/EEC EN 50081-2, EN 50082-2</td>
</tr>
<tr>
<td><strong>Housing Material</strong></td>
<td>Noryl N190</td>
<td>Noryl N190</td>
</tr>
<tr>
<td><strong>Electrical Connection</strong></td>
<td>Terminal housing</td>
<td>Terminal housing</td>
</tr>
</tbody>
</table>

*If palm button face is not covered, its output relays will not be activated. If palm button face is covered, the sensor defaults to a safe state (output relays are deactivated).*

### Important

This sensor has been tested to meet UL 491 Standard regarding safety devices.

Before installing, refer to ANSI B11.1, B11.19 and OSHA 1910.217. Should the switch be used in a two-hand control application, each hand control shall be protected against unintended operation and arranged by design, construction, and/or separation so that the concurrent use of both hands is required to trip the press. The control system shall be designed to permit an adjustment which will require concurrent pressure from both hands during the die closing portion of the stroke. The control system shall incorporate an antirepeat feature. The control systems shall be designed to require release of all operator's hand controls before an interrupted stroke can be resumed.

Should the switch be used in a two-hand trip application, a two-hand trip shall have the individual operator’s hand controls protected against unintentional operation and have the individual operator’s hand controls arranged by design and construction and/or separation to require the use of both hands to trip the press and use a control arrangement requiring concurrent operation of the individual operator’s hand controls. Two-hand trip systems on full revolution clutch machines shall incorporate an antirepeat feature.

Rings or shrouds are commonly used to protect palm-actuated buttons from unintentional actuation. Precautions in design or installation are needed to prevent actuation of two buttons by the use of one hand and the elbow of the same arm and to inhibit other circumvention of the two-hand requirement.

The device shall be located a distance from the nearest hazard such that the operator cannot reach the hazard with a hand or other body part before cessation of motion of the hazardous portion of the machine cycle. Descriptions of formulas for distances, between the switches and from the nearest hazard, can be found in American National Standards Institute (ANSI) B11.1 and B11.19.

Since each two-hand control or trip application is different, the user needs to make sure that all Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI) requirements are followed.

This device shall be installed so that the distance between the terminal connections of the palm button switch and a dead metal part (including the enclosure) is a minimum of 1/4".
Ergonomic Palm Buttons

Dimensions (in.) unless otherwise specified

To order palm button only, specify
PB1-008-6 (AC)
PB2-008-6 (DC)

LED indicates energized output relays

To order full assembly with a 1-hub box and ring guard, specify
PB-A02-008-6 (AC)
PB-D02-008-6 (DC)

To order full assembly with a 2-hub box and ring guard, specify
PB-A04-008-6 (AC)
PB-D04-008-6 (DC)

NOTE: A clearance of 1/2" is recommended between the top of the palm button and the height of the ring guard.

Key To Model Numbers for Assemblies
PB-A02-008-6

01 — Palm Button Assembly with Cover Plate & Gasket
02 — Full Assembly with 1-Hub Box and Ring Guard
04 — Full Assembly with 2-Hub Box and Ring Guard
19 — Full Assembly with 1-Hub Box and U-Channel Guard
20 — Full Assembly with 2-Hub Box and U-Channel Guard

A — 120VAC Supply (PB1-008-6)
D — 24VDC Supply (PB2-008-6)

To order palm button assembly with cover plate and gasket, specify
PB-A01-008-6 (AC)
PB-D01-008-6 (DC)

NOTE: A clearance of 1/2" is recommended between the top of the palm button and the height of the ring guard.

To order full assembly with a 1-hub box and U-Channel guard, specify
PB-A19-008-6 (AC)
PB-D19-008-6 (DC)

To order full assembly with a 2-hub box and U-Channel guard, specify
PB-A20-008-6 (AC)
PB-D20-008-6 (DC)

FS Box Components & Accessories
PB-FSBG-1H — Palm button FS box (1 hub)
PB-FSBG-2H — Palm button FS box (2 hubs)
PB-FSBGA — Gasket only
PB-PFRG — Round ring guard (green)
PFRG — Round ring guard (red)
PB-CAP — Protective Cap
PB-CPG — Protective Cap
PB-FSBED — Housing cover plate

To order palm button assembly with cover plate and gasket, specify
PB-A01-008-6 (AC)
PB-D01-008-6 (DC)

Palm Button Model No. PB1-008-6 or PB2-008-6

Palm Button Gasket

FS Box Cover Plate

Palm Button Locking Nut

FS Box Gasket

NOTE: A clearance of 1/2" is recommended between the top of the palm button and the height of the ring guard.

(4) Set-screwing machine screw with O-ring

Palm Button Model No. PB1-008-6 or PB2-008-6

Palm Button Gasket

FS Box Cover Plate

Palm Button Locking Nut

FS Box Gasket

NOTE: A clearance of 1/2" is recommended between the top of the palm button and the height of the ring guard.
Ergonomic Palm Buttons

Reliably activates even when operators wear heavy gloves

<table>
<thead>
<tr>
<th>Specifications</th>
<th>AC PB1-010-9</th>
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<tbody>
<tr>
<td>MODEL NUMBER</td>
<td></td>
</tr>
<tr>
<td>ACTUATION</td>
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<td>OUTPUT RELAY: Contact Set.</td>
<td>2 — Normally open 2 — Normally closed</td>
</tr>
<tr>
<td>CURRENT RATING (resistive and inductive)</td>
<td>1A, AC or DC</td>
</tr>
<tr>
<td>VOLTAGE RATING</td>
<td>250VAC max.</td>
</tr>
<tr>
<td>MECHANICAL LIFE</td>
<td>≥5x10^7</td>
</tr>
<tr>
<td>ELECTRICAL LIFE</td>
<td>≥5x10^6</td>
</tr>
<tr>
<td>SUPPLY VOLTAGE</td>
<td>120VAC/45-60Hz</td>
</tr>
<tr>
<td>LED(s)</td>
<td>YES (1)</td>
</tr>
<tr>
<td>POWER CONSUMPTION</td>
<td>≤1W</td>
</tr>
<tr>
<td>MECHANICAL SHOCK TEST LIMIT</td>
<td>45g for 2ms</td>
</tr>
<tr>
<td>VIBRATION TEST LIMIT</td>
<td>f≤60Hz @ ≤1mm, max. 4g</td>
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Since each two-hand control or trip application is different, the user needs to make sure that all Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI) requirements are followed.

This device shall be installed so that the distance between the terminal connections of the palm button switch and a dead metal part (including the enclosure) is a minimum of 1/4".

**CAUTION**
The PB1-010-9 is insensitive to splashing, liquid residue and metal chips or shavings tested by Pepperl+Fuchs, Inc. There is a slight possibility that a mixture of liquids, as well as liquids and metal chips or shavings might affect its operation. P+F recommends that the user evaluate wet applications prior to installation.
Ergonomic Palm Buttons

Dimensions (in.) unless otherwise specified

To order palm button only, specify
PB1-010-9

To order palm button assembly with cover plate and gasket, specify
PB-A01-010-9

NOTE: A clearance of 0.63 is recommended between the top of the palm button and the height of the U Channel guard.

Key To Model Numbers for Assemblies

PB-A02-010-9
- 01 — Palm Button Assembly with Cover Plate & Gasket
- 19 — Full Assembly with 1-Hub Box and U-Channel Guard
- 20 — Full Assembly with 2-Hub Box and U-Channel Guard
- A — 120VAC Supply

To order full assembly with a 1-hub box and U-Channel guard, specify
PB-A19-010-9

To order full assembly with a 2-hub box and U-Channel guard, specify
PB-A20-010-9

NOTE: A clearance of 0.63 is recommended between the top of the palm button and the height of the U Channel guard.

FS Box Components & Accessories
- PB-FSBG-1H ......... Palm button FS box (1 hub)
- PB-FFGA ............. Gasket only
- PB-PRG ............. Round ring guard (green)
- PB-CAP ............. Protective Cap
- PB-CG .............. Cover plate/gasket
- PB-FSBCG .......... Housing cover plate

LED indicates energized output relays

Screw terminals
Ergonomic Palm Buttons

Standards and Safety Information

Pepperl+Fuchs capacitive palm buttons are the first palm buttons to be recognized under UL491 “Standard for Power Operated Machine Controls and Systems.” By following UL491, P+F palm buttons comply with the following standards:

The palm button was specifically designed with the operator's health and safety in mind. In order to meet the standards, special features had to be incorporated such as fault monitoring and redundancy. The applicable standards are listed below:

- **Self-checking electronics, with a visual indicator, constantly monitor the Palm Button for proper operation.**

- **Redundant output relays with captive contacts ensure a safe output.**

### National Fire Protection Association: NFPA

- **NFPA 79**
  - The Standard for Metal Working Tools

- **NFPA 70**
  - National Electrical Code

  The NFPA is a non-profit organization which writes standards to protect against damages caused from the hazards of fire.

### American National Standards Institute: ANSI

- **ANSI B11.1**
  - "Mechanical Power Presses — Safety Requirements for Construction, Care and Use."

- **ANSI B11.19**

  ANSI is a non-profit organization which has developed recommended standards for machine building safety.

### Occupational Safety & Health Administration: OSHA

- **OSHA 1910.217**
  - "Mechanical Power Presses"

  OSHA is a governmental agency which develops standards that are incorporated into laws. OSHA possesses the power to inspect facilities and enforce these laws.

- **UL 491, SA 4.3**
  - "In addition to the tests specified in paragraph SA 4.2 controls containing critical devices or components, are to be subjected to electrical supervision."

- **OSHA 1910.217 (13)**
  - "... The failure shall be detectable by a simple test, or indicated by the control system. . . ."

- **ANSI B11.1**
  - Control Component Failure (control reliability) (4) “Control component failure may utilize a combination of ‘cross-checking,’ ‘self-checking,’ and ‘redundancy.’”

### ANSI B11.19

E5.5 Control Reliability

“Some electromechanical systems utilize relays that have contacts that can fail closed while the other contacts on the same relay continue to function. Other relays have contacts that can fail open while the other contacts on the same relay continue to function. Because of this fact, only relay types that prevent this occurrence from happening should be used. “Electromechanical systems that require redundancy and checking of relay contacts should use relays that are designed with mechanical linkages to provide a positive relation between normally open and normally closed contacts to check the contact operation. Solid-state devices do not have a mutually exclusive normally open-normally closed contact arrangement. Other methods must be used to monitor the performance of these devices.”

- **UL 491 42.**
  - Operation and Component Failure

  “42.1 — ” Control circuit examination or operational checks, or both, are to be conducted to determine fail safe operation of the machine control under component failure conditions as noted in Supplement A and the following:

  - E. Relays with mechanical malfunction (blocked open or closed).
  - F. Relay coils under open conditions.
  - G. Relay contacts under permanently weld-closed conditions.”